COMMONWEALTH OFFICE OF TECHNOLOGY

COT
Cloud *Computing*

Delivering hosted services
over the Internet

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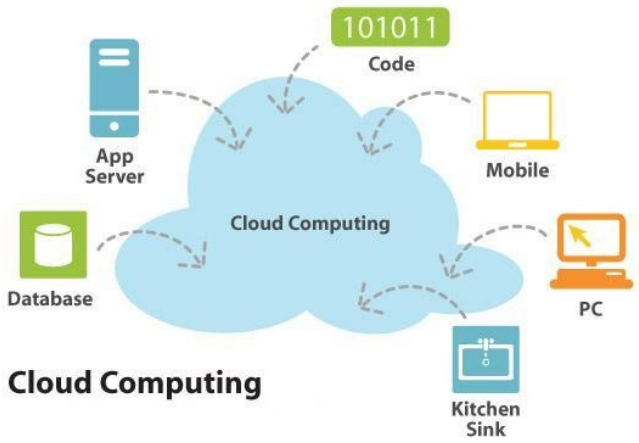

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Cloud Computing

Cloud computing is a general term for anything that involves delivering hosted services over the Internet.

COT's cloud computing infrastructure consists of reliable Infrastructure-as-a-Service and Software-as-a-Service delivered through data centers that host highly scalable and redundant servers to insure accessibility of its users.

This cloud service has three distinct characteristics that differentiate it from traditional hosting.

1. It is sold on demand, typically by the minute, the hour, the day, etc. or by usage volumes.
2. It is elastic -- a user can have as much or as little of a service as they want at any given time.
3. The service is fully managed by the provider.

Significant innovations in virtualization and distributed computing, as well as improved access to high-speed Internet and a weak economy, have accelerated interest in cloud computing.

Cloud computing users can avoid capital expenditure (CapEx) on hardware, software, and services when they pay a provider only for what they use.

Consumption is usually billed on a utility or subscription basis with little or no upfront cost. Sharing "perishable and intangible" computing power among multiple tenants can improve utilization rates, as servers are not unnecessarily left idle. This can reduce costs significantly while increasing the speed of application development. Other benefits of this time sharing style approach are:

- Low barriers to entry
- Shared infrastructure and costs
- Low management overhead
- Immediate access to a broad range of applications.

Software as a Service (SaaS)

In the Software-as-a-Service cloud model, the vendor supplies the hardware infrastructure and the software product. The user interacts through a front-end portal. SaaS is a very broad market. Services can be anything from Web-based email to inventory control and database processing. Because the service provider hosts both the application and the data, the end user is free to use the service from anywhere. Currently there are a few Software as a Service offerings within COT.

- The electronic Management Administrative & Reporting System, **eMARS** financial system gives state agency customers a fully web-based application for purchase and contracting functions.
- COT's messaging service offers email access via a browser with the **Outlook Web Access (OWA)** tool. Agency email customers can log directly into their mailboxes from anywhere in the world with Internet access and a browser.
- **ePay** (ePayment Gateway) is another good example of a SaaS provided by the Finance and Administration Cabinet via the State Controller and COT. State agencies can act as a merchant and provide online payment services to constituents, e.g. Fish & Wildlife acts as a Merchant and sells fishing and hunting licenses online to citizens.

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Infrastructure as a Service

(continued)

- The **On-line Storage** service is a highly available, fully redundant, and scalable environment. This type of environment leads to very little, if any at all, down time to the customer. We currently manage almost 115TB of disk storage between Mainframe, SAN, and NAS.
- The **On-line Backup** provides a flexible/scalable deployment to meet your ever changing needs. Backups are retained at a Tier 3 facility to minimize risks. We can protect your data with our cost effective, fully automated backup solutions.

Platform as a Service (PaaS)

Platform-as-a-Service in the cloud is defined as a set of virtual servicers, software and product development tools hosted on the provider's infrastructure. Developers create applications on the provider's platform over the Internet. PaaS providers may use APIs, website portals or gateway software installed on the customer's computer. We provide file management for agencies to run their applications in these virtual environments:

- z/OS
- Unix/Linux
- AIX
- Windows

Infrastructure as a Service (IaaS)

Infrastructure-as-a-Service provides virtual server instances with unique IP addresses and blocks of storage on demand. Customers use the provider's application program interface (API) to start, stop, access and configure their virtual servers and storage. In the enterprise, cloud computing allows a company to pay for only as much capacity as is needed, and bring more online as soon as required. .

The virtual server environment is a good example of Infrastructure as a Service. The team can spin up a new server for a requesting agency customer and have it ready for business in minutes. Soon we will be initiating a new offering for an unmanaged virtual server. Upon request, the team will create a new instance of a virtual server to be handed off and completely managed by the agency IT staff.

- The **Virtual Private Network** (VPN) service was established to facilitate secure and encrypted access to the Commonwealth's private network from foreign networks (including the public Internet). Users can securely access systems such as email, eMARS, KHRIS, VoIP systems, etc from virtually anywhere using their Microsoft Active Directory credentials.
- The Commonwealth of Kentucky's Enterprise **Voice over IP** (VoIP) phone system scalable to 50,000 users, and can be accessed via a hardware handset or softphone (client software) from any intranet or VPN connection. Users have the freedom to make and receive calls from their state phone number, as well as access telephony resources such as the Call-Pilot voice mail, auto-attendant, and audio conference call system from virtually anywhere.